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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/528,889	03/20/2000	Gregory N. Hullender	1204	5627

7590 08/27/2002

LAW OFFICES OF ALBERT S. MICHALIK, PLLC
704-228TH AVENUE NE
SUITE 193
SAMMAMISH, WA 98074

EXAMINER

MILLER, MARTIN E

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 08/27/2002

163

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/528,889	HULLENDER ET AL.
Examiner	Art Unit	
Martin Miller	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 29 May 2002.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-27 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 20 March 2000 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. _____.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____ .

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . 6) Other: _____ .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed May 29, 2002 have been fully considered but they are not persuasive. Applicant argues that Pintsov at col. 3, ll. 44-45 does not teach, "using the output of a primary recognizer as the basis for selecting a secondary recognizer"; however, Pintsov states, "Any particular specialist classifier [secondary recognizer] is selected based upon the probable identity of a candidate character as determined by the universal classifier system [primary recognizer]" (col. 3, ll. 47-48). Pintsov goes on to teach that the suspicious character can be based upon the type of character or by an assignment of a character candidate to a predefined group (col. 3, ll. 50-60). Additionally, the universal classifier supplies the image data to the specialist classifier (col. 3, ll. 43-45), which shows the autonomy of the specialist classifier from the universal classifier. If Pintsov's universal classifier truly called the specialist classifier, then why did Pintsov use quotation marks around "call" (col. 3, l. 45)? In both Pintsov and the claimed invention, the decision to implement the specialist classifier (secondary recognizer) is made immediately after the character is recognized (Pintsov, "probably identity, col. 3, ll. 48) and the selection is based upon that identity. In addition, Pintsov teaches that several universal classifiers can be used to recognize a character and then a call is made to select a specialist classifier, which would require a post recognition determination whether the specialist should be called by a part of the system other than a universal recognizer (col. 3, l. 65-col. 4l. 22).

Response to Amendment

2. The newly added claims were incorrectly numbered. Claim number 21 is missing and there are two claims numbered "23". The examiner has renumbered the claims to place them in

their proper numerical order. This did not effect the claim dependence of any of the claims. For purposes of examination the claims have been renumbered to be in the proper order, so claim 22 will be referred to as claim 21 and the first occurrence of claim 23 will be referred to as claim 22 in this office action.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1, 2, 7, 8, 12, 20, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov, US 5881172.

As per claim 1, Pintsov teaches:

providing a primary recognizer (universal classifier system, abstract, col. 2, 11. 7-34, col. 20, 11. 28-54) for converting chirographs (col. 2, 1. 21, "styles of handwriting" and col. 2, ll. 34-35) to shape indexes; applicant states in his arguments that the out put of the primary recognizer could be "in the form of a shape index , such as a code point" (pg. 11 of amendment entered into the file September 20, 2001), Pintsov's universal classifier outputs "machine-readable data, typically in ASCII form', col. 1, ll. 47-49. Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.

providing a plurality of secondary recognizers ("specialist classifiers", col. 3, 11. 16-18) to convert chirographs into code points (col. 4, 11. 10-14), and associating the secondary recognizers with at least some of the shape indexes ("ambiguity classes", col. 3, 11. 18-21),

receiving a chirograph (col. 1, 11. 10-11, "automated recognition of . . . handwritten characters").

providing a chirograph to a primary recognizer and receiving a shape index therefrom (col. 3, 11. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.).

Pintsov does not teach, other than using the recognition result of the universal classifier (primary recognizer) to select the specialist classifier (secondary recognizer), that the specialist classifier without further decision by the primary recognizer. Pintsov discloses that the universal classifier "calls" the specialist classifier. By using quotes it is ambiguous as to whether Pintsov system does a specific call to the classifier or based upon the output of the universal classifier another portion of the system makes the call. But such a determination is well within the ordinary skill of one in the art to call the specialist classifier based on commands executed in the universal classifier or a part of the system that receives the output from the universal classifier and calls the specialist classifier. Additionally since Pintsov teaches that the selection is based upon the probable identity of the candidate character, the universal classifier has already made a decision on the character.

without further decision by the primary recognizer, determining whether one of the secondary recognizers is associated with the shape index ("Any particular specialist classifier is selected based upon the probable identity of a candidate character... and whether the candidate character is 'suspicious'."), and if so, selecting that secondary recognizer as a selected secondary recognizer. Furthermore, in discussing figure 5, Pintsov states that one or more universal

classifiers are applied to the image data to generate a probable character, and then a determination is made to call the universal classifier (col. 3, l. 65-col. 4, ll. 22). Having possibly conflicting reports from each universal classifier as to call or not call seems to not be what Pintsov is teaching, Pintsov appears to be teaching that a determination is made to call a specialist classifier only after the character is recognized and determined to be part of the suspicious class of characters.

It would have been obvious to one of ordinary skill in the art to use either the universal recognizer to call the specialist classifier or merely output a recognition result and another part of the system call the specialist classifier. Such decisions are made to take advantage of processing efficiencies of the host computer systems and also to bring to bear the full power of various feature extraction algorithms to accurately identify characters that may be part of a specific ambiguity class of characters (Pintsov, col. 3, ll. 30-35).

As per claims 7, 20 and 23, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply.

As per claim 21, Pintov teaches:

wherein the shape index does not correspond to a code point (col. 3, ll. 48, "probable identity", and col. 4, ll. 13-20, where the final output is a code).

As per claims 2, and 8, they recite identical limitations and, therefore, the following remarks apply to each.

Pintsov teaches:

shape index comprises a code point (the output of the universal classifier is a "machine-readable data, typically in ASCII form', col. 1, 11. 47-49, or col. 3, 11. 55-60, "character

candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.)-

As per claim 12, Pintov teaches:

wherein the recognition result comprises a code point. (col. 1, 11. 47-48).

5. Claims 19 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov as applied to claims 1 and 7, further in view of Shimizu et al. (hereinafter Shimizu, US 6038343).

As per claims 19 and 22, Pintsov teaches that his specialist classifiers are called when a character is determined to be suspicious (col. 4, 1. 10-22). However, Shimizu teaches:

wherein each shape index that the primary recognizer (fig. 1, element 11) is capable of outputting has a unique secondary recognizer (fig. 1, element 17) associated therewith.

It would have been obvious to one of ordinary skill in the art to use the writer specific feature vectors of Shimizu to augment the system of Pintsov to increase the ratio of a character recognition system employing a universal recognition dictionary without requiring that special operations be performed before character recognition is performed on the handwriting of a new writer (Simizu, col. 2, ll. 17-22, col. 3, ll. 1-6).

6. Claims 13-15, 17, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov as applied to claims 1 and 7, further in view of Crane, US 4,531,231.

As per claim 13, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply. Claim 13 does have two different limitation that requires further explanation. Pintsov teaches that his recognition system can be used for automated

recognition of handwritten characters (col. 1, ll. 10-11), but he does not specifically state an interface means for accepting a handwritten character data. Pintsov teaches accepting image data from some device (see figure 4, element 3). The claim recites that the use of an "interface configured to receive a chirograph", Crane teaches an interface (see figs. 1 elements 12 and 14). It would have been obvious to one of ordinary skill in the art to utilize the handwriting input means of Crane in the system of Pintsov to provide a registration means so that Pintsov could accept handwritten characters so that Pintsov could utilize his method of automated handwriting recognition. Additionally, the Crane reference is used to illustrate that such an interface feature is well-known in the art of computer-based handwriting recognition.

The second limitation is partially addressed by the comments with respect to a similar limitation in claim 1 however, the selection mechanism is not completely disclosed, however, Pintsov teaches:

a selection mechanism that selects a selected secondary recognizer based on the shape index, without further decision by the primary recognizer (col. 3, l. 65-col. 4, l. 22).

As per claim 14, Pintsov teaches:

shape index comprises a single code point (the output of the universal classifier is a "machine-readable data, typically in ASCII form", col. 1, ll. 47-49 or col. 3, ll. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.).

As per claim 15, Pintsov teaches:

wherein the shape index comprises a single code point that differs from the returned code point (col. 4, ll. 15-23, Pintsov states, "Note that the character determined by the selected specialist classifier may be the same character determined as being most probable by the universal classifier system" (emphasis added). This statement indicates that the code point returned may differ from the code point provided to the specialist classifier.

As per claims 17, they recite generally the same limitation as claim 15 except more broadly and analogous remarks apply.

As per claim 24, Pintov teaches:

wherein the shape index does not correspond to a code point (col. 3, ll. 48, "probable identity", and col. 4, ll. 13-20, where the final output is a code).

As per claim 25, Pintov teaches:

wherein the recognition information does not correspond to a code point, (col. 3, ll. 48, "probable identity") and wherein the recognition result comprises a single code point (col. 4, ll. 13-20, where the final output is "a" code (singular)).

7. Claims 16, 18, 26 and 27 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Pintsov and Crane as applied to claim 13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per claim 18, Pintsov does not teach a specific means to accept a chirograph, however, Crane teaches:

receiving a chirograph (figure 1, elements 12 and 14). Although Crane teaches providing the shape information to a character set discriminator (figure 1, element 16), the examiner is relying upon the teachings of Pintsov to teach the recognition method.

Pintsov teaches:

providing the chirograph (image data, figure 4, element 3) to a primary recognizer (universal recognizer, figure 4, element 8) and receiving recognition information therefrom a primary recognizer for converting chirographs to code points (col. 1, 11. 47-49). determining whether the recognition information corresponds to a recognized result (col.. 4, 11. 11-23) or has a value indicative [of a specialist classifier]. Pintsov teaches that the specialist classifier can be selected based upon any desired criteria including "assignment of a character candidate to by the universal classifier system to a predefined characters groups known to be ambiguous", col. 3, 11. 50-60). The examiner is interpreting this portion of the disclosure to mean that the universal recognizer assigns a character value to the input data, such as an ASCII value for the number "4", his system, then looks at the predefined characters that are part of an ambiguity set, which includes "4" due to its resemblance to "9". Therefore, Pintsov teaches that the specialist recognizer is selected based upon the value returned from the universal classifier.

and without the primary recognizer making a further decision (col. 3, l. 65-col. 4, l. 10).

Pintsov does not specifically teach the use of CART trees as specialist classifiers. Pintsov does, however, teach that the "specialist classifiers may be implemented in any desired fashion using... algorithms known in the art of character recognition" (col. 3, ll. 26-31). Guo teaches a recognition algorithm that is known in the art.

Guo teaches Cart trees are used to solve difficult pattern recognition problems with complex decision or human judgment boundaries (col. 2, second paragraph, p. 183). Guo also teaches that a decision rule is associated with a tree col. 1, second paragraph, p. 184

Pintsov teaches the structure of the following claims and Guo teaches the use of a CART tree:

determining whether the recognition information corresponds to a recognized result or has a value indicative of a CART tree being associated therewith (Pintsov, col. 3, 11. 50-60, Guo, section 4.2);

if the recognition information corresponds to a recognized result, and if the recognition information has the value indicative of the CART tree being associated therewith, providing chirograph information to the CART tree and returning a recognition result wherefrom, the recognition being independent of the value indicative of the CART tree. (Pintsov, col. 4, 11. 4-22, Guo, section 4.2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bear on the specific ambiguity class to provide a more accurate result.

As per claim 16, it simply recites the use of a CART tree as a secondary recognizer and the remarks in rejecting claim 18 above apply to those claims. 9.

As per claim 26, Pintov teaches:

wherein the shape index does not correspond to a code point (col. 3, ll. 48, "probable identity", and col. 4, ll. 13-20, where the final output is a code).

As per claim 27, Pintsov teaches:

wherein the recognition result comprises a single code point (col. 4, ll. 13-20, where the final output is "a" code (singular)).

8. Claims 3-6 and 9 -11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov and Crane as applied to claim 13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per claims 3 and 9, Pintsov teaches the "specialist classifiers may be implemented in any desired fashion using... algorithms known in the art of character recognition" (col. 3, 11. 26-31). Guo teaches a recognition algorithm that is known in the art.

Guo teaches:

wherein the secondary recognizer is a CART tree. (section 4.2)

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bring to bear the full power of various feature extraction algorithms known in the art of character recognition to accurately identify characters that may be part of a specific ambiguity class of characters (Pintsov, col. 3, ll. 30-35) by using a method that improves on

standard classification tree design methods by reducing the number of nodes and having a lower error rate (Guo, abstract)

As per claim 4 and 10, Guo teaches:

training the secondary recognizers by providing a first training set comprising a plurality of chirographs and actual code points for each chirograph (p. 185, sect. 3.1, second paragraph). Guo states that the pattern vectors (actual code points) and their class labels (chirograph) are at a given node. Further in section 4.2 he states that the handwritten character is encoded into pattern vectors.

As per claims 5 and 11, Guo teaches:

wherein training the secondary recognizers further comprises determining a plurality of distinguishing features of the chirographs based on predetermined criteria. Guo teaches that CART trees are grown by recursively finding splitting rules until it cannot be split further (p. 184, sect. 2.1 TREE GROWING. He further teaches in his introduction section, p. 183, that trees classify an input pattern through a chain of decisions. Typically decisions when flow charted are presented in the form of a question (e.g., Does value x exceed threshold b?).

As per claim 6, Guo teaches:

wherein the predetermined criteria correspond to questions, and wherein training the secondary recognizers further comprises determining a question ordering by measuring the quality of each question. (p. 185, sect. 3.1 TREE GROWING, last paragraph of col. 1 and first part of col. 2.) Guo teaches that two different criteria are optimized to find a "good split", it is obvious in the use of CART trees that a quality question would result in a "good split".

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Miller whose telephone number is (703) 306-9134. The examiner can normally be reached on Monday-Friday, Maxi-flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

MAA
8/25/02

